A NEW TURKEY FROM THE PLIOCENE OF NEBRASKA

Larry D. Martin and James Tate, Jr.

A study of avian fossil material from the Upper Pliocene of Nebraska has revealed the presence of a new genus and species of turkey (Meleagrididae). The type specimen and the referred material are deposited in the University of Nebraska State Museum Collections (UNSM).

This material, including two left coracoids (UNSM 20033, complete and 20034, humeral ⅓), two ♀ tarsometatarsi (UNSM 20037, lacking trochlea and 20035, proximal ⅔), and a spur core (UNSM 20036), was collected from the lower part of the Kimball Formation, UNSM Coll. Loc. Ft-40, south of Lime Creek in Frontier County, Nebraska. The Kimball Formation is the upper formation of the Ogallala Group and is older than the San Pedro Formation of Arizona and the Rexroad Formation of Kansas, in which *Agriocharis progenes* Brodkorb occurs. A discussion of the stratigraphy of the Ogallala Group is outlined by Schultz and Stout (1961:7,9, Fig. 3). Vertebrate faunal lists for the Kimball Formation have been published by Schultz and Stout (1948:557, Table 1), modified by Kent (1963:14. Table 1) and include: *Megalonyx*; *Hypolagus*; *Perognathus*; *Thomomys*; *Dipoides stirtoni* Wilson; *Dipoides williamsi* Stirton; saber-toothed tiger (undet.): *Amebelodon fricki* Barbour; *Teleoceras*; *Neohipparion*; *Pliohippus* (*Astrohippus*); *Pliohippus* (*Dinohippus*); *Nannipus*; *Prosthenops*; *Procamelus*; *Pliauchenia*; *Cranioceras*; *Texoceros guymonensis* Frick; *Sphenophalos middleswarti* Barbour and Schultz; *Citellus kimballensis* Kent; and *Aphelops kimballensis* Tanner.

Proagriocharis gen. nov.

Type species.—*Proagriocharis kimballensis* Martin and Tate

Diagnosis.—Agrees with the Meleagrididae in having the median surface of the head on the coracoid flattened (also flattened in the Cracidae, but it is notched in the Tetraonidae and Phasianidae); brachial tuberosity lacking overhang (present in Tetraonidae and Phasianidae), and the scapular facet concave. Tarsometatarsus long and slender as in female turkeys and some Phasianidae (relatively short and stout in the Cracidae and Tetraonidae); inner calcaneal ridge long as in most Meleagrididae, most Tetraonidae, and most Phasianidae (ridge short in Cracidae, *Gallus* and other Galliformes).

Proagriocharis differs from other genera of turkeys in having the following combination of characters: Coracoid resembling *Parapavo* and differing from *Meleagris* and *Agriocharis* in that the scapular facet is nearly rounded rather than elongate; the procoracoid is blunted, and the shape of the head is oval with indistinct mid-ventral notch. It resembles *Agriocharis* and differs

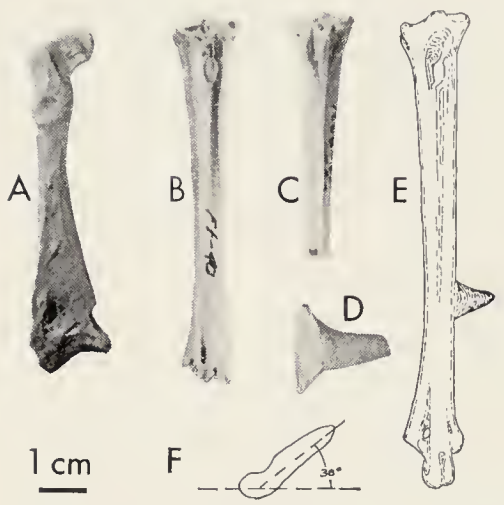

FIG. 1. A. Holotype of *Proagriocharis kimballensis* (UNSM 20033), left coracoid. B. Referred right tarsometatarsus (UNSM 20037), anterior view. C. Referred left partial tarsometatarsus (UNSM 20035), posterior view. D. Referred left spur core (UNSM 20036). E. Drawing of cast of right male tarsometatarsus, anterior view (see text). F. Cross section of right tarsometatarsus and spur core showing angle at which spur stands with the frontal plane of the bone.

from *Parapavo* and *Meleagris* in that the head is raised above the inner surface of the neck. *Proagriocharis* differs from the other genera of turkeys in the shape of the coraco-humeral ligamental attachment which is elongate and lacks a distinct border on the outer side of the neck (triangular and having a distinct border on the outer side of the bone in the other Meleagrididae (Howard, 1927:6)). It also differs from the other three genera in that the pneumatic fossa is smaller and the triosseal canal is deeper so that the inner surface of the neck just below the head is reduced, producing a much thinner neck. The head is free from the neck for a greater distance than in any other turkey.

The tarsometatarsus resembles *Agriocharis* and differs from *Parapavo* and *Meleagris* in the angle of the spur core to the acrotarsal surface (less than 60°; greater for *Parapavo* and *Meleagris*, less for *Agriocharis*). The spur core (cast) is more proximally placed (42 per cent of the total length) than it is in *Agriocharis ocellata* (36 per cent of the total length), and just overlaps the lower range of *Parapavo* and *Meleagris* in this respect.

Proagriocharis kimballensis sp. nov.

Holotype.—Left coracoid (Fig. 1A), UNSM 20033 from UNSM Coll. Loc. Ft-40, south of Lime Creek, E ½, E ½, SW ¼, Sec. 15, T5N, R26W, Frontier County, Nebraska. The stratigraphic occurrence is Pliocene, Ogallala Group, Kimball Formation.

Table 1

Measurements in Millimeters of Two Bones from *Proagriocharis kimballensis* Martin and Tate, and *Agriocharis progenes* Brodkorb.

Measurement	*P. kimballensis*	*A. progenes* (Brodkorb, 1964)
Coracoid	UNSM 20033	
Total length	66	—
Length to pneumatic foramen	58	65
Head through scapular facet	23	31
Width of head	9	10.8
Least width of shaft	6	10.1
Tarsometatarsus	UNSM 20037 ♀	
Width proximal end	13	—
Length to top distal foramen	69	—

Referred material.—The humeral end of a left coracoid, UNSM 20034. A right tarsometatarsus lacking the trochlea, UNSM 20037 (Fig. 1B). The proximal end and greater part of the shaft of the left tarsometatarsus UNSM 20035 (Fig. 1C) and an isolated left spur core UNSM 20036 (Fig. 1D). All of this material is from the same locality and horizon as the holotype.

In the collections of the University of Nebraska State Museum there is also a cast (UNSM 20038) of an almost complete right male tarsometatarsus here referred to *Proagriocharis kimballensis*, from the type locality (Fig. 1E). The original was in the private collection of Alex Keith (now deceased), who owned the property on which UNSM Coll. Loc. Ft-40 is situated. The whereabouts of the original specimen is presently unknown.

Diagnosis.—Coracoid very small; flexure of the humeral end 63° to the axis of the shaft. Outer posterior intermuscular line curving away from the outer border of the shaft more than in *Parapavo*, *Meleagris*, or *Agriocharis ocellata* cutting across the dorsal surface of the shaft just above the midpoint. The inner posterior intermuscular line curving in from the inner border of the shaft more than in the other turkeys. The intermuscular lines similar in general form to those found in some of the Tetraonidae (i.e., *Tympanuchus cupido*). The sterno-coracoidal process less developed than in *Parapavo*, *Meleagris*, or *Agriocharis ocellata* extending only slightly beyond the sternal facet.

Tarsometatarsus represented by two mature female specimens, and a spur core. The spur core long and well shaped as in *Agriocharis*. Tarsometatarsus thin, tapering distally. An incipient third ridge between the inner and outer ridges of the hypotarsus; the facet for the first toe (hallux) high and pos-

teriorly situated; the inner distal foramen a small depression. The cast shows a small, penetrating inner distal foramen.

The following measurements are taken from the cast and therefore probably differ slightly from the original: total length 98 mm, length to top of the distal foramen 84 mm, width of the proximal end 14 mm, height of middle of spur core 40 mm above tip of middle trochlea, angle of spur core to the acrotarsial surface 38° (Fig. 1F).

DISCUSSION

Proagriocharis kimballensis appears to be the oldest and smallest species of turkey described to date. *Agriocharis crassipes* from the Late Pleistocene of Mexico also has a small coracoid, but it is stouter and the tarsometatarsus of *A. crassipes* is larger as well as being more heavily built. The spur core is set at about the same angle (39°) as it is in *Proagriocharis kimballensis* and is only slightly more proximal in position (45 per cent of the length of the shaft). In these features *Agriocharis crassipes* is closer to the new genus than it is to any of the other described species of *Agriocharis*. *Proagriocharis* was a turkey about the size of a Sage Grouse (*Centrocercus urophasianus*) with slim feet and a slender spur core. Miller (1940:156), described *Agriocharis crassipes* as ". . . a bird with small body and wings, but with tremendously heavy feet, armed with an unusually stout spur."

Agriocharis leopoldi (Miller and Bowman) and *A. progenes* Brodkorb are the two turkeys closest in time to *Proagriocharis* as both are Blancan in age (regarded as Early Pleistocene in this paper (see Flint, 1965)). *Proagriocharis* may be a suitable ancestor for both species, but they are not presently included in the new genus because of the difference in the placement of the spur core in these species. *Agriocharis leopoldi* has the spur core at a much greater angle (53–58.5°) and placed slightly lower (39.8 per cent of the total length) than it is in *Proagriocharis* (see Miller and Bowman, 1956:44). *Agriocharis progenes* has the angle of the spur core slightly less (50°) and the core slightly more distally placed than in *A. leopoldi*. *A. progenes* lacks the pneumatic fossa on the dorsal base of the shaft of the scapula (Brodkorb, 1964:226), and this might be expected to be absent from the scapula of *Proagriocharis* also. Both *Agriocharis leopoldi* and *A. progenes* are much larger than *Proagriocharis kimballensis*.

Although the coracoid has several features in common with *Parapavo*, *Proagriocharis* seems to have its greatest overall resemblance to *Agriocharis*. Despite their separation in time there is a great similarity in size between *A. crassipes* and *Proagriocharis*. This is probably due to a secondary development of small body size in *Agriocharis crassipes* by the late *Pleistocene*. *A. crassipes* differs from *Proagriocharis* in the proportions of the limb bones

which are much heavier in the former. The evolution of the turkeys during the Pleistocene was apparently explosive. Three genera and eight species (*Agriocharis leopoldi*, *A. progenes*, *A. anza*, *A. crassipes*, *A. ocellata*, *Meleagris alta*, *Meleagris gallopavo*, and *Parapavo californicus*) are probably all sound species, most of which appear to have developed during the Pleistocene. Modern turkeys represent a depauperate group by contrast, with only two surviving species.

ACKNOWLEDGMENTS

We are indebted to Pierce Brodkorb and C. Bertrand Schultz for critically reading this manuscript and offering many valuable suggestions. Dwight Brennfoerder prepared the illustrations.

LITERATURE CITED

Brodkorb, P. 1964. Notes on fossil turkeys. Quart. J. Florida Acad. Sci., 27:223–229.

Flint, R. F. 1965. The Pliocene-Pleistocene Boundary, Geol. Soc. Amer., Special Paper, No. 84, Intern. Studies on the Quaternary, p. 497–533.

Howard, H. 1927. A review of the fossil bird *Parapavo californicus* (Miller), from the Pleistocene asphalt beds of Rancho La Brea. Univ. California Publ. Bull. Dept. Geol. Sci., 17:1–56.

Kent, C. 1963. A late Pliocene Faunal assemblage from Cheyenne County, Nebraska. Unpubl. M.S. thesis, Univ. of Nebraska, Lincoln, Nebraska.

Miller, A. H. and R. I. Bowman. 1956. Fossil birds from the late Pliocene of Cita Canyon, Texas. Wilson Bull., 68:38–46.

Miller, L. 1940. A new Pleistocene turkey from Mexico. Condor, 42:154–156.

Schultz, C. B. and T. M. Stout. 1948. Pleistocene mammals and terraces in the Great Plains. Bull. Geol. Soc. Amer., 59:553–588.

Schultz, C. B. and T. M. Stout. 1961. Field conference on the Tertiary and Pleistocene of western Nebraska. Univ. Nebraska State Mus. Special Publ., no. 2.

STATE MUSEUM AND DEPARTMENT OF ZOOLOGY, UNIVERSITY OF NEBRASKA, LINCOLN, NEBRASKA. (PRESENT ADDRESS: (J.T.) LABORATORY OF ORNITHOLOGY, CORNELL UNIVERSITY, ITHACA, NEW YORK), 17 JUNE 1968.